Name _____

CIS 343

Midterm Exam – Fall 2018

Instructions

Be sure to answer all questions completely. Some questions have multiple parts. Use complete sentences; single words or phrases are not enough. Put your name on the top of this paper. For five points use the name of a famous computer scientist for your middle name. The exam is worth 100 points. If you receive any testing accommodations through the Disability Support Services Office I will be happy to provide them – but you must let me know; I don't receive a list.

Questions

1. Take a deep breath. This is just a way for me to assess what you have learned in this class. It isn't that big a deal. Aside from a paper cut this exam cannot harm you.

2. List and define the three criteria we use to determine the fitness of a language for a particular purpose. Describe what each of the three means. 15 pts.

3. C is a higher level language than Assembly. Is this fact alone enough to say that C is more readable than Assembly language? Why or why not? 10 pts.

4. Define **orthogonality** as it pertains to programming languages. Give an example. 10 pts.

5. Imagine that programming language Alpha has a single operator for addition that can add integers or floating-point numbers. Language Beta has two operators for addition, one for integers and a different one for floats. Which is more orthogonal, and why? 10 pts.

6. Prove the Turing Completeness (TC) of the esoteric language Malboge that was created specifically for obfuscation. Do the obfuscation features prevent the standard TC method of describing all μ-recursive functions? Just kidding, take a deep breath and relax.

7. There are two types of abstraction. List and define them, then provide an example of each. Circle the one that came first. 10 pts.

8. What are the two composite data types that C provides? What is the difference between them, and which one should you (almost) never use? 5pts.

9. Write a complete include guard for an *.h file. Use ellipses ("…") for missing code. 5 pts.

10. What is the difference between the **heap** and the **stack**? When should you use one or the other? 10 pts.

11. On a 64bit system, what does the following output? 5 pts.

```
#include <stdio.h>
#include <stdlib.h>

int main(int argc, char** argv){
    int* x = malloc(50 * sizeof(int));
    // %lu prints out the value as
    // an unsigned long integer
    printf("%lu\n", sizeof(x));
}
```

12. List and define the 6 ways we classify variables. 10 pts.

13. Match the following (2pts each):

a. COBOL
b. ADA
c. C
d. Fortran
e. LISP

1. Created by the Department of Defense for business use.

2. Generally considered the first compiled language.

3. Stressed flexibility.

4. Created for artificial intelligence research.

5. Based on Pascal; was an enormous design effort that considered comments from people around the world.